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ABSTRACT

The Rancho La Brea asphalt seeps of Los Angeles, California is the site of the richest and most diverse assemblage of Pleistocene mammal fossils in the world. The conventional mechanism for the formation of this deposit has herbivorous mammals getting stuck in pools of asphalt one at a time. Carnivores and scavengers were then attracted to the captive herbivore, to become trapped in asphalt themselves in large numbers. This is assumed to have occurred more or less continuously over the last 38,000 years.

Sedimentological and paleontological evidence calls for another interpretation. There is evidence that asphalt did trap some animals - mainly small mammals, small birds, reptiles, and insects in more recent times. Rancho La Brea lacks the evidence expected at a trap site. However, evidence of rapid deposition of the sediments in which the fossils are found argues that most of the animals - especially the larger Pleistocene extinct species - were actually deposited by flash flood events, which in turn attracted scavengers which may have become stuck in the asphalt and buried in subsequent floods on the Los Angeles / Orange County floodplain. Earthquake disruption and liquefaction may also have been factors which accelerated entombment of some of these animals. Evidence further indicates that deposition was not continuous, but a series of rapid catastrophic pulses. Finally, the slow seepage of asphalt through faults in the older underlying marine strata resulted in the remarkable preservation of these fossils.

This deposition is here re-interpreted to be the result of local catastrophism during the waning geologic catastrophism of the post-Flood period. This corresponds with the postFlood climatic cooling which led to what is commonly called the Ice Age.

INTRODUCTION

The Rancho La Brea fossil beds are located in Hancock Park, in downtown Los Angeles, California at an altitude of 165 to 175 Feet above sea level on the Hollywood alluvial fan, which stretches from the Santa Monica Mountains 3.54 Km to the northwest to the Pacific ocean 14 Km southwest of the pits [26, p.7-8]. The La Brea site was known for thousands of years by local Indians up to the present time as a source of asphalt for water proofing, hafting knives, cement for repairing implements, and securing ceremonial decorations [9, p.2]. The discovery of Clovis points and atlatals used to kill big game such as mammoths indicates a long history [26, p.23]. The first white man to take notice of the asphalt was Gaspar de Portola who noted it in his diary of the expedition of 1769-1770 on August 3, 1769 [26, p.2].

Original Appearance of the "PITS"

Before modern mining-by the white man started in the late 1800s the "pits" were hard asphalt mounds which looked like tar volcanos with crater-shaped vents several meters in diameter giving off explosive eruptions of large quantities of methane gas and asphalt flows. These flows ran down the mounds and in hot weather formed thin sheets only a few centimeters thick which hardened into layers. When work first started to mine the asphalt, the hard oxidized asphalt cap had to be dynamited to expose the soft liquid [17, p.178].

The Discovery of Bones

During the course of these mining operations, bones were found in the hard matrix. These were believed to be the common bones of modern cows and horses [29, p.174-175] stuck in the asphalt. These bones were thrown aside as a worthless nuisance. The discovery that these were ancient fossils of buffalo and horses was made when the owner of the property, Major Henry Hancock found a large canine tooth larger than anything he had ever seen which came from a saber-toothed cat and gave it to Professor William Denton of the Boston Society of Natural History in 1875 [26, p.3-4].

There was no further interest in these fossils until thirty years later, when geologist W. W. Orcutt re-discovered their importance when he examined the La Brea property to determine the possibility of developing the property for the production of petroleum. He discovered that several of the bones he had collected on his visit were extinct species. He immediately got permission to continue collecting bones and from 1901 to 1906 Orcutt obtained a good representative collection of typical species found at the site. This collection attracted the attention of Dr. John C. Merriam, a professor at the University of California at Berkeley, later to become president of the Carnegie Institute where he continued to fund the La Brea excavations through the work of one of his favorite students, Chester Stock. Stock became one of the most important and knowledgeable mammalian paleontologists in the United States. He also became a world expert on the La Brea site, having conducted extensive research resulting in over 25 technical papers, as well as the classic reference book Rancho La Brea: A Record of Pleistocene Life In California, sold for many decades at the Los Angeles Museum of Natural History's bookstore [26, p. xv-xiv; 18].

The Amazing Collection of Fossils

Through the work of these scientists about 10-thousand individual animals have been recovered from the asphalt [25, p.24]. The estimated total fossils recovered so far comes to 2-million bones, 100-thousand insects, 40-thousand mollusks, and uncounted microscopic plant and animal remains. There are about 600 different kinds of plant and animal species reported so far [26, p.1].

Origin of Trap Model

The interpretation of this site as a trap is found for the first time in the journal of Jose Longinos Martinez in 1792, where he states that birds and rabbits get stuck in the asphalt [8, p.114]. Then again in 1865, state geologist J. D. Whitney says he saw the bones of cattle and birds which had become entangled in what had become hardened asphalt [29, p.174-175]. Then after the discovery that these were the bones of extinct animals, John C. Merriam extended this uniformitarian explanation, claiming La Brea was an asphalt trap going back thousands of years into the Pleistocene. This theory met the expectations of Darwinian theory and it appeared to fit the observed data, so it has become dogma to the present time [19].

Trap Model Questioned

Starting immediately with the indepth research by Chester Stock and many others, evidence has accumulated which causes the researchers to question the trap model. This paper is a review of some of that evidence, and proposes a new interpretation of La Brea which is more consistent with our current level of knowledge, as well as the Biblical creation model of earth history.

THE STRATIGRAPHY OF LA BREA

The La Brea deposits are among the most superficial of deposits of the Los Angeles / Orange County Basin. Although wells have not penetrated the entire thickness of the basin sediments, it is thought that they lie atop the granodiorites and biotite-quartz diorite granites which characterize the northern margin of the Southern California batholith (see Figure 1) [33]. The origin of the batholith is conventionally assigned to the Jurassic.

The 5 to 9 Km [18] of sediments overlying the igneous bedrock are dominantly marine strata and are given stratigraphic assignment based upon contained benthic foraminifera [6; 24]. Beginning at the nonconformity above the igneous bedrock (see Figure 1) there is unidentified sediment believed to be the Sespe Formation (Lower Miocene), then (in succession) the Topanga Formation (Middle Miocene), and the Puente Formation (Upper Middle to Upper Miocene) [15]. The huge biomass of marine organisms in the Puente Formation (one of the largest in the world, producing one of the largest oil deposits) is thought to have been responsible for producing most of the petroleum in the Los Angeles / Orange County Basin syncline and surrounding areas [14, p.197; 6, p.136]. This includes the Old Salt Lake Oil Field less than a mile north of the La Brea mammal site. Atop the Puente Formation (see Figure 1) are the Repetto (Lower Pliocene) and Pico Formations (Upper Pliocene to Lower Pleistocene) [15; 21]. As the region's sediments were being deformed by faulting and tilting of the underlying rock, the Pico sediments were grading from deep-water marine turbidite sandstones, through mudstones into shallow marine coarse-grained clastics [32, p.228]. Apparently the Santa Monica Mountains were being elevated at this time, resulting in a regressive sequence of lithologies. Overlying the Pico Formation (see Figure 1), the Palos Verdes

formation [15; 21] (with lateral equivalents in the Times Point Silt, La Habra, and San Pedro Formations [32, p.227]) continues this trend. The lower part of the Palos Verdes Formation (informally called member A) is composed of marine clastics which grade into more terrestrial alluvial deposits [26, p.7]. The attitude and relationships of the older underlying marine shales, sandstones, and oil sand indicate a period of upthrusting, folding, then erosion; Followed by the deposit of the terrestrial alluvial fan, made up of sand, clay, and gravel containing terrestrial material and fossils. This terrestrial material was being laid down on top of an erosional unconformity between it and the underlying marine rock as the upheaval waned, upwarping only the lowermost layers, leaving most of the mammal bonebeds in an essentially horizontal strata (see Figure 2).

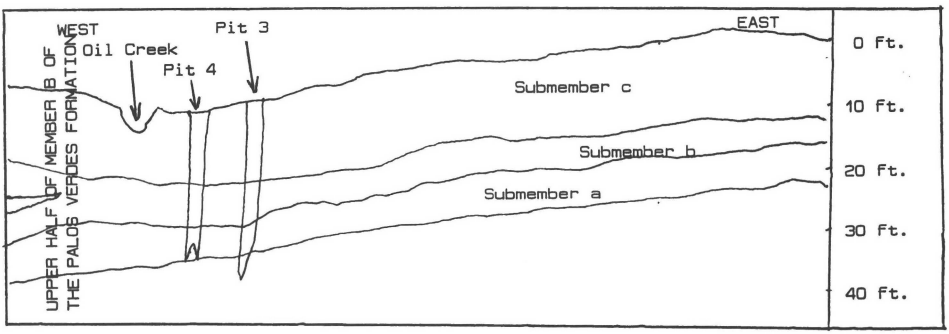

Figure 1. ***A cross section of the fossiliferous strata at Rancho La Brea, along an east-west direction across Hancock Park. From Shaw and Quinn (1986) [27, p.8].***

PALOS VERDES $\frac{mbr\ B}{mbr\ A}$ 122m (400ft)
PICO 305m to 915m (1,000ft to 3,000ft)
PEPETTO 5,490m (18,000ft)
PUENTE 2,380m (7,800ft)
TOPANGA GROUP 640m (2,100ft)
SESPE 365m (1,200ft)

Figure 2. Generalized stratigraphic chart of the Los Angeles basin from Blake [6, p. 139]

The fossils of La Brea are found in distinct bonebeds in the upper half of member B of the Palos Verdes Sand formation [26, p.12]. Marine member A and the lower half of member B of the Palos Verdes Sand formation have been conventionally assigned to the Sagamonian Interglacial period (100,000 y.b.p.) based upon foraminifera and nonoplankton assemblages [27; 30; 26, p.7]. In the bonebeds, radiocarbon dates range from 38,000 years b.p. to 11,000 (with a very few exceptions) [17; 26, p.9]. Conventional dating thus argues for a hiatus in deposition of somewhere on the order of 60,000 years within the Palos Verdes formation. At the La Brea site, the sediments of the bonebeds of upper member B are coarse angular to fine clastics of the Hollywood alluvial fan. The absence of marine organisms and the presence of terrestrial land animals and fresh-water mollusks argues that the deposits are terrestrial. The structure of the fan and the lithology of contained clasts indicates that the source rock of the Hollywood alluvial fan is outwash material whose parent rock is found in Benedict, Coldwater, and other nearby canyons northwest of the pits in the Santa Monica Mountains. The Palos Verdes Sand Formation thins from its exposures in the Santa Monica Mountains to its deposit on the coast [31]. In excess of 58 meters thick in places

at the foothills of the Santa Monica Mountains, the Palos Verdes Formation has thinned to 42.7 m by the time it has gotten to the La Brea site 3.54 Km distant [26, p.12]. It is important to note that the Hollywood alluvial fan is no longer a depositional surface, but an area of erosion. The fan is currently being dissected and eroded in a dendritic pattern by rivers and streams [26, p.7]. This plus the coarse nature of the sediments indicate that substantially larger volumes of water than are experienced today were responsible for the deposition of the sediments of La Brea and other mammal sites in the Los Angeles area.

Oil, apparently derived from the organic material of the Puente formation (see Figure 1) seeped to the surface in various localities from Cape Mendocino to Los Angeles - a distance of 724 Km - from a layer of this oil bearing marine shale averaging 610 m thick. This shale outcrops and has produced asphalt seeps at McKittrick, Maracapa, the marine cliffs in Santa Barbera, Carpinteria, and at La Brea [29, pp.174-175; 19, p.20]. At La Brea, the petroleum seeped to the surface through faults produced during Pleistocene deposition. The residue of this oil upon evaporation produces asphalt. In the specific case of La Brea in Hancock Park, the clustered alignment of asphalt seeps along a northwest-southeast trend throughout the length of the park indicates seepage along the sub-surface fault discovered along Sixth Street bordering the north side of the park [26, p.8; 2]. The remarkable preservation of the fossils at La Brea is due to asphalt impregnation. The same assemblage of fossils can be found at many sites around the world, although usually not as well preserved. The unique preservation of the La Brea fossils have made them a standard for comparison. Any assemblage of fossil mammals similar to that at La Brea is conventionally considered to have been deposited in the same period of time (the 'Rancholabrean Land Mammal Age') as those at La Brea -- namely Late Pleistocene (38,000 to 11,000 y.b.p.).

In Hancock Park the bonebeds are in the upper 9 m of member B. The uppermost 9 m of member B has been informally divided into three bonebed submembers (see Figure 2) [26, p.8]. The lowermost is bonebed a, which is 3.5 m thick. Overlying this is bonebed b at 2.1 m thick, and finally atop this is bonebed c, comprising the uppermost 3.4 m of the Palos Verdes Sand formation in Hancock Park. Individual asphalt pits in the park can be restricted to one of these bonebeds or cross-cut into several of them. Since asphalt has actually caused a considerable amount of post-depositional transport of bone material, bones found in asphalt pits are often not in situ and bones from different levels in the bonebeds may be mixed together. Most of the radiocarbon ages have been determined on bones extracted from large asphalt pits. Yet, even with the mixing, the radiocarbon ages are confined to three periods of time (38,000 to 19,300 years b.p.; 15,700 to 11,000 years b.p.; and 10,000 years b.p. to the present [17]) and roughly three stratigraphic levels. Those levels may represent the three bonebeds a, b, and c, possibly indicating three periods of deposition.

Bonebeds a and b are apparently those which-have produced the distinctive Pleistocene 'Rancholabrean' mammal association. The Holocene deposits of bonebed c appear to be qualitatively different. With the exception of cases where mixing has brought up material from lower bonebeds, those characteristics which distinguish bonebed c from the underlying bonebeds a and b include:

(1) a more superficial position (above 3.4 m depth) [17].
(2) a distinctive matrix, with a substantially lighter color [11, p.44-47; 17; 27, p.16].
(3) exclusively Holocene (post-10,000 y.b.p.) radiocarbon dates -- which are known **ONLY** from level c deposits (e.g. the human skeleton at 9,000 +/- 80 y.b.p. [5] and an atlatal foreshaft at 4,450 y.b.p. [27]
(4) more 'pit wear' (inter-stratigraphic abrasion due to post-depositional transport within asphalt pits)
(5) weathering due to subaerial exposure
(6) toothmarks from scavengers, which have **ONLY** been reported from level c deposits and never identified with Pleistocene carnivores or scavengers [26, p.19].
(7) human bones and artifacts [26, p.10] -- which again are known **ONLY** from level c deposits (e.g. a single human skeleton and three atlatals).
(8) a fauna with a smaller average body size [26, p.10; 11, p.46-47; 25, p.16].
(9) a lower percentage of extinct species [11, p.44; 25, p.16].
(10) typical Pleistocene mammals being absent or rare [11, p.44].

THE TRAP MODEL

Most people, after observing the sticky tar in pools, then the asphalt-impregnated bones of mammals, have drawn the conclusion that these are obviously the remains of animals which got stuck in asphalt. The anomalously high percentage of carnivores lends weight to this hypothesis. Of the 10-thousand animals recorded in field reports over the size of a weasel, 10% are herbivores and 90% are carnivores [26, p.177]. In a natural environment the ratio would be the opposite because it takes many herbivores to support a few carnivores. To explain the ratio, researchers suggested that herbivores got stuck in the asphalt, attracting large numbers of unwary carnivores and/or scavengers, who also became stuck. This hypothesis, which seems to explain the large predator/prey ratio, was called the "death trap of the ages" model.

Evidence Against Trap Model

(1) An Asphalt Trap Is Not Needed

McKittrick is another asphalt site above the town of McKittrick west of Bakersfield in the oil Fields of Kern County, California - which is identical to La Brea in many ways [22]. This fact is important because, if McKittrick is fluvial and not a trap as most experts confirm, then La Brea could have formed in a similar manner. McKittrick has the same assemblage of animals, it is in the same horizon, and is dated very similar to La Brea. La Brea is dated by Carbon-14 as 11 to 38-thousand y.b.p.; to McKittrick's 10 to 38-thousand years b.p. [26, P-9; 22].

John R. Schultz, an expert on asphalt sites, concludes that McKittrick was not a trap site because the tar seeps to the surface in thin sheets only about 2-centimeters thick, much too thin to trap anything but very small animals and insects [22]. This was also true at La Brea before asphalt mining destroyed the strata and created the pits and pools [9, p.14; 17, p.178]. According to Marcus and Berger this prejudiced early researchers at La Brea to incorrectly interpret it as a trap site [17, p.178].

Additionally, the author has a coyote skull (*Canis latrans*) from Cherokee County, Iowa (see Figure 3) which is identical to coyote skulls found in the La Brea pits. It even has a bituminous coating which may have helped preserve it without petrification by mineralization. The difference is that it did not come from an asphalt seep. It came from a typical fluvial Pleistocene sand deposit, which has some post-depositional asphalt impregnation. Thus, it is at least possible to create a deposit like La Brea **WITHOUT** a trap mechanism.

Figure 3. ***Fossil bones of rodents, birds, and a fox jaw from the McKittrick asphalt seeps. The finger bones of a large rodent are twice the size of a modern squirrel. See the modern squirrels hand in the lower right corner for comparison.***

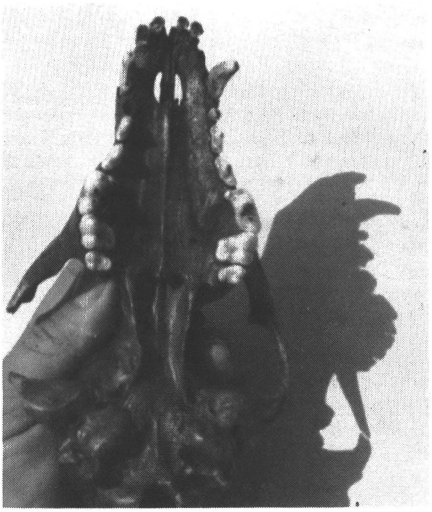

Figure 4. ***Fossil coyote skull with bituminous coating From a Pleistocene fluvial deposit in Cherokee County, Iowa. Dorsal view A, ventral view B. Notice the tooth wear. It is identical to those found at La Brea and McKittrick.***

(2) Some Mammals at La Brea Definitely Were Not Trapped

The first blow to the "death trap of the ages" hypothesis which attracted the attention of La Brea researchers was in 1968 when they excavated a massive, arenaceous blue-clay enclosing grey quartz sand and gravel lenses with occasional asphalt pockets and seeps on the western margin of Hancock Park along Ogden Drive. Here they encountered isolated bones, including part of a saber-toothed (*Smilodon fatalis*) skull in sediment which contained **NO** asphalt when it was deposited. G.D. Woodard states that this, "...supports the conclusion that many bones throughout Rancho La Brea were deposited, and in all likelihood concentrated into pockets, by such fluvial agencies" [30, p.66]. Asphalt in such sedimentary pockets is a later intrusion, as indicated by higher asphalt concentration in the lower portions of the pockets [23]. The most important researcher, Chester Stock writes, "...some (animal remains) may have been transported considerable distances; such fluvial accumulations were secondarily impregnated by asphalt" [26, p.14]. This conclusion is shared by other researchers [8; 20; 23].

Again in 1975, while excavating at the east end of Hancock Park, for the foundation of the George C. Page Museum, a tongue-shaped sedimentary body was discovered which contained fully and partially articulated skeletons and associated skeletal parts. It was found 1.5 meters below ground; and was 10 meters long, 3 meters wide, and 0.4 meter thick. It was deposited in sharp basal contact with a massive claystone below, and overlain with silty claystone. This deposit was unusual because unlike all the "pit" deposits:

(1) It was not funnel shaped with apex down (believed to have been created by the manner of excavation).

(2) Many of the bones were not disarticulated [13, p.71].

(3) It was poorly impregnated with asphalt [23, p.79].

Scott [23, p.79] argues that entrapment was **NOT** indicated in this particular deposit, but that asphalt impregnation was post-depositional. Thus at least some of the La Brea fossils were **NOT** captured by means of the trap mechanism.

(3) Evidence of Fluvial Deposition

Scott E. Miller states that as far as the asphalt trap model is concerned, "recent studies... indicate that such 'death traps' had only a minor role in the accumulation of fossils". He continues that the stratigraphy in the pits and Carbon-14 dating indicate fossils were deposited at sites of discontinuous active asphalt seeps during accumulation of alluvium. This was because, it was discovered during the course of excavation of undisturbed fossil bonebeds, stratification was noted which would not be found in pools of asphalt. And it was further recorded that these

stratified layers continued on into non-fossiliferous, non-asphaltic sediment surrounding the pits [20, p.92-93].

All this evidence indicates that most of the animals in the asphalt deposits could have been buried by the fluvial processes which created other sedimentary fossil mammal sites. It may be that only a small percentage of the fossil material was trapped in asphalt, and the few animals that were, were buried by alluvial processes [17, p.177-178; 2] identical to other typical sedimentary fluvial deposits. These other fluvial mammal sites have these characteristics:

(1) They contain identical species of animals, such as Camp Cady, Yermo, the Calico Mountains in and near the dry Pleistocene Lake Manix Basin [12, p.94].

(2) The fossils are in the same strata and horizon.

(3) They are also in nearby areas in strata connected to the strata at La Brea, arched over the Dominguez Hills 19 Km to the south of La Brea, in the Palos Verdes Hills, and San Pedro [26, p.7].

(4) No Age or Health Bias

Dr. John C. Merriam predicted (based on the assumed trap model) in 1911, that the greatest number of animals in the tar pits would be the old and the young (i.e. the weak, diseased, and inexperienced) [19, p.209]. Since then, bone growth, tooth growth, and tooth wear studies by G. J. Miller indicate that all ages of saber-toothed (*Smilodon fatalis*) cat were present, and are consistent with the age frequency distribution found for living populations of African lion today [17, p.178]. All ages, as well as weak, and strong, are also found among the horses of La Brea [23, p.79]. Scott states that those individuals younger than six months comprise only 10% to 15% of the general population, which is normal for a herd of horses [23, p.79]. Such non-selective assemblages argue against asphalt entrapment and for catastrophic burial [1, p.122].

(5) No Fossils In Pure Asphalt

If La Brea was a trap site one might expect many of the bones to be found in pure asphalt and not just in hard sediments with asphalt between the grains. At La Brea very few bones were found in pure asphalt alone - and these were not in situ. All reports show that most or perhaps all of the bones were entombed in hard asphalt impregnated sand, gravel, or clay. Also, the greatest concentrations of bones occurred in sediments containing the highest concentrations of clasts of fluvial origin [30, p.56].

(6) Lack of Footprints

There is a mammoth trap site deposit at Hot Springs, South Dakota, where erosion of limestone produced a karst feature (a sink hole). A herd of Pleistocene mammoths ([*Mammuthus columbi]* identical to the species found at La Brea) fell into this hole alive to be mired in quicksand, trampled, then buried by incoming fluvial sediment. Tracks found in several levels of the sediment indicate the animals were alive at the time of entrapment [1, p.118]. If Rancho La Brea's mammoths, bison, horses, etc., "were captured in shallow surface sheets of viscus asphalt" as John M. Harris tells us, "rather than in large pools or 'Pits'" [9, p.10], fossil ichnites would be expected to be found on the underlying hardening asphalt or clay, but **NONE** are reported.

(7) Lack of Green-Bone Spiral Fractures

At the Hot Springs site there are many leg bones with green-bone spiral fractures, caused by torsional stress on living bone, as the animals tried to twist their feet out of the sticky mud. At the Page Museum they allow testing of the viscosity of asphalt by trying to pull a rod out of a container of asphalt. Asphalt is much stronger than mud. This being a case, there should be more green-bone spiral fractures at La Brea than at the Hot Springs site - and yet there are no reported cases of this kind of fracture at all.

(8) No Evidence of Trampling

Also at the Hot Springs site there is evidence of trampling - of crushed and broken bones. No such evidence has been reported at La Brea.

(9) Molluscs, etc.

Present were the shells of freshwater clams (*Anodonta californiensis, Pisidium casertanum, P. compressum, Musculium lacustre, and M. partumeium*) and snails (*Valvata humeralis, Pyrgulopsis californiensis, Fossaria modicella, F. parva, F. (Bakerilymnea) cubernsis, F. (B.) sonomaensis, F. (B.) bulimooides, F. (B.) cockerelli, Stagnicola elodes, S. proxima, Physella concolon, Gyraulus circumstriatus, G. parvus, Planorbella tenuis, and Menetus, opercularis*).

Since it is unlikely that such organisms could live in asphalt seeps, their presence here, as well as, the fluvial sites, such as Camp Cady in the Mojave Desert, argue that the asphalt impregnated the matrix **AFTER** deposition [12, p.94; 26, p.85]. Furthermore, since these shellfish are the kind carried into the area by freshwater rivers, and they surround the bones in the La Brea seeps, the bones may have been deposited in the same manner.

LA BREA IS A POST-FLOOD DEPOSIT

Like all Pleistocene fossil sites, La Brea was deposited in the waning catastrophism (after shocks) during the resettling period after the Flood.

Evidence:

(1) Pleistocene sites are usually only partly lithified or are unconsolidated sand and gravel laid down by glacial or fluvial processes near or on the surface.

(2) Pleistocene bones are seldom replaced by volcanic (usually silicon) mineralization. They are usually preserved as original bone under conditions of reduced decomposition in ice, caves, bogs lacking oxygen, surrounded by clay, or in asphalt.

(3) Pleistocene animals, plants, and insects are usually identical or very similar to living organisms; often still living around the fossil site or a little farther north (due to changes in weather patterns) [26, p.25].

(4) Pleistocene animals are commonly found in limestone caves or karst features. Since vast limestone deposits were formed during the Flood under submarine conditions, and caves can only form in aerial conditions, by flowing ground water above the water table; then any bones of animals entering these caves had to have been deposited after the Flood.

(5) Biblical and archaeological evidence indicates that only post-Flood or paleolithic (incorrectly called 'cave men' because of art found in French caves and ape skulls found in caves in Peking both of which were sites of industry not habitation) began with a lithic industry, because of a lack of more advanced technology; caused by their being scattered throughout the earth from Babel, according to the Bible. These paleolithic men are often associated with Pleistocene animals; drawing pictures of them on cave walls, carved on mammoth bones, left atlatal projectile points in the bones of mammoths, etc.

CREATION MODEL AT LA BREA

The evidence is overwhelmingly in favor of locally catastrophic fluvial flood plane deposition of all the sediments and most of the fossils at Rancho La Brea and at other asphalt sites. It appears that these animals were living during a stressful period of earth history - that of the immediate post-Flood era. Huge volcanoes erupting world-wide during the Flood, continued after it was over. Earthquakes upthrust mountain ranges, and torrential rains during what is called the paluvial period flooded inland areas during the cooling period (the sky was filled with volcanic dust for many years) leading to the so called, "Ice Age". This was the aftermath, or reshaping, rebalancing, and settling period of the global cataclysm called the Flood of Noah [4, p.134; 7, p.206].

The area around La Brea during this period is described by geologist Stephen Harris:

> The more earth scientists learn about the physical evidence left by large earthquakes and volcanic eruptions during the recent geologic past, the clearer it becomes that such events are an integral part of the western scene [10, p.6].

Harris goes on specifically describing what happens during a huge earthquake resulting in volcanic eruptions. He says that sandy ground with a high water table turns into liquid sand geysers which erupt out of the ground [10, p.10]. It is interesting to note that Rancho La Brea is made of sand with a high water table, which could produce the liquefaction that turns the ground into rolling, gushing watery mush which can trap and bury living organisms suddenly.

Other Rancholabrean fossil sites like Camp Cady in the Mojave Desert have **ALL** the animals found at La Brea, except there is no asphalt, and there the herbivorous camels (rare at La Brea) are in the majority. Perhaps, during severe storm events in the post-Flood hard times, herbivorous animals sought food and safety on higher ground [12, p.97]. The carnivores, on the other hand, being mostly scavengers, sought an easy meal on the lower floodplanes, where the dead were washed down in the torrents.

Resent Reports Confirm these Conclusions

At this time, one of the most recent reports on research at La Brea and related asphalt sites (July 23, 1993) confirm the conclusions found in this research. The examination of thousands of jaws from several asphalt sites indicates that the teeth of Dire wolf, coyote, sabertoothed cat, and the American lion were fractured while they were still alive three times as much as equivalent carnivores today [28, p.456].

The researchers Blaire Van Valkenburgh and Fritz Hertel conclude that:

> It suggests that times were tough for these Pleistocene species; prey must have been difficult to acquire or retain. Prey availability may have been low, at least seasonally, forcing predators to fully consume their prey. Alternatively, predator densities might have been relatively high, resulting in intense competition over kills" [28, p.459] (NOTE: This would explain the high carnivore ratio).

The catastrophic aftermath of the Great Flood of Noah no doubt created catastrophic aftershocks for hundreds of years due to the resettling of the land after the upheaval, requiring rebalancing of the earth. This resettling is still going on today under Los Angeles, as well as, elsewhere around the world - resulting in earthquakes and volcanic eruptions with decreasing severity. That is, until the end times - when it will once again be like those days.

High Carnivore Ratio Explained

The fossil record shows a bias for concentrations of herbivorous animal tracks in lake, delta and costal planes; and for the tracks of carnivorous animals in floodplain depositional environments [17, p.126].

CONCLUSION

The evidence at La Brea indicates that the Pleistocene assemblage was deposited during stressful times, during a period of geologic upheaval and massive flooding.

The asphalt was the result of impregnation after and during the deposition of sedimentary strata, which resulted in the amazingly well preserved fossil bone and other organisms which would otherwise have been destroyed by acid ground water. The asphalt did trap some animals. However, they are mostly recent Holocene victims, consisting of small mammals, small birds, reptiles, and insects.

The evidence supports the conclusion that Rancho La Brea was a site of post-Flood waning local catastrophism only a few thousand years ago (possibly 5-thousand years as indicated in the Bible) where surficial deposits collected the remains of local flood victims, deposited on top of huge marine deposits formed during the Noachian Flood which collected in a sink hole created by the incline forming the Los Angeles/Orange County basin.

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